General

Guideline Title

Environmental management of pediatric asthma. Guidelines for health care providers.

Bibliographic Source(s)

National Environmental Education & Training Foundation (NEETF). Environmental management of pediatric asthma. Guidelines for health care providers. Washington (DC): National Environmental Education & Training Foundation (NEETF); 2005 Aug. 56 p. [112 references]

Guideline Status

This is the current release of the guideline.

The National Environmental Education Foundation, Inc. reaffirmed the currency of the guideline in 2013.

Recommendations

Major Recommendations

Environmental History Form

- The Environmental History Form is available in the original guideline document and on the Web (http://www.neefusa.org/resource/asthma-environmental-history-form)
- This form is intended for use with children already diagnosed with asthma. Designed for ease of use, the Environmental History Form is obviously not comprehensive and is intended as an initial intake tool.
- It is recommended that a health care provider (physician, nurse, nurse practitioner, or physician's assistant) administer the questions rather than being given to the patient's caregiver to fill out.
- This form should also be used to elicit information on triggers commonly overlooked, such as weekly trips to a relative where a hobby or pet is located.

Environmental Intervention Guidelines

- These environmental intervention guidelines are to be used for children already diagnosed with asthma. A separate fact sheet is provided for each of the major environmental asthma triggers. The questions on these fact sheets are intended to supplement the questions listed in the environmental history form related to each trigger. Interventions that are thought to be the most crucial for each asthma trigger are listed first and in bold type.
- In addition to educating families on effective interventions, it is also important to explain why certain interventions are not recommended, particularly the use of ozone-generating air cleaners which may be harmful.

- Providers should give families affected by asthma: educational materials (an example of a patient handout is listed under each trigger); relevant website information; and information about allergy supplies, smoking cessation programs, and other community resources.
- The intervention guidelines assume a two-visit concept for the patient. The first visit includes taking an environmental history, possible allergy testing or referral, and a commitment by the parent to work on reducing exposures to known allergens or irritants. The second, follow-up visit involves counseling of the patient or patient's family on controlling the exposures that trigger the child's asthma. In addition to this two-visit concept, providers should work with the family to schedule appropriate follow-up visits to evaluate the patients' self-management skills. It is very important to ask about all environments in which a child with asthma may be spending significant amounts of time, including all residences where the child sleeps or spends time, such as schools, daycares, camps, and college dorms.
- Although primary care providers do not perform skin testing as an asthma specialist might, in vitro testing is an option that may be considered. However, any testing should be focused on allergens that are identified by the environmental history, and should not replace timely allergy referral. The health care provider should try to document sensitivity for each suspected allergen through allergy testing before making any major or costly recommendations related to environmental controls. However, some simple and low cost recommendations may be reasonable, particularly in areas where widespread exposure to cockroaches or dust mites is well known. Providers can assist families in implementing environmental interventions by helping them prioritize the changes they make in the home. For example, providers can encourage families to begin by creating a safe sleeping zone for the child.
- A separate fact sheet is not provided for outdoor pollens (from trees, grass, or weeds) and molds. To avoid exposures, children should be recommended to stay indoors with windows closed in an air conditioned environment — if possible — during the season in which they have problems with outdoor allergens, especially during the afternoon.
- Viral illnesses are not included in this list of environmental triggers, although their importance in triggering and exacerbating asthma is recognized. Primary care providers should remain aware that when a child with known asthma develops an upper respiratory infection, an asthma exacerbation is likely to follow.
- Environmental management is only one component of a comprehensive asthma management plan. It is recommended that these materials be used in conjunction with the National Asthma Education and Prevention Program's clinical and pharmacological guidelines.

Dust Mites and Asthma

Additional History Questions to Supplement the History Form

- Did you know that dust mite exposure can trigger asthma symptoms?
- What type of floor covering is in your child's bedroom?
- Do you have a vacuum cleaner with a high efficiency particulate air (HEPA) filter?
- What have you tried so far to reduce dust/dust mite exposure?
- How often do you wash your child's bed linens?
- Are you currently using a mattress or pillow covering on your child's bed?
- Do you use other ways to decrease dust mite exposure?

Possible Interventions

No matter how clean a home is, dust mites cannot be totally eliminated. The following suggestions can reduce exposure. Emphasis should be placed on reducing dust mite exposure where the child sleeps.

- Encase all pillows and mattresses of the beds that the child sleeps on using allergen impermeable encasings. (There are numerous sources for allergen impermeable encasings, and prices as well as quality may vary.)
- Wash bedding weekly to remove allergen. Wash in hot water (130Ës F) to kill mites
- Replace wool or feathered bedding with synthetic materials that will withstand repeated hot water washing
- Either remove from the bedroom or wash and thoroughly dry stuffed toys weekly
- Move stuffed toys away from the pillow the child sleeps on
- Vacuum once or twice weekly preferably using a vacuum cleaner with a HEPA filter or a double-layered microfilter bag (when the child is not around)
- Use a damp mop or rag to remove dust, not a dry cloth that just stirs up dust mite allergens
- Avoid use of humidifiers
- The following interventions are expensive and are only recommended after an allergist has identified your child as allergic to dust mites:
    - Consider replacing draperies with blinds or other wipeable window covering
    - Consider carpet removal in the child's bedroom
    - Consider removing upholstered furniture
    - Consider using portable air cleaner with HEPA filter for child's bedroom

- Avoid use of ozone generators and certain ionic air cleaners which can actually generate harmful ozone

Animal Allergens and Asthma

Additional History Questions to Supplement the History Form

- What type of furry pet(s) do you have (and how many of each)?
- Is it a strictly indoor pet? outdoor? indoor/outdoor?
- Does your child sleep with the pet?
- Has your child's asthma become worse since having the pet?
- If you moved your pet outdoors, did your child's asthma improve?
- If there is evidence of rodents in your home, how severe is the problem (mild, moderate, severe, very severe)
- Does your child's classroom (or other places he/she spends time) have a furry pet that he/she plays with?

Possible Interventions

Interventions with regard to pets should only be recommended if the child is allergic to the animal. Testing should therefore be done before making any recommendations. To reduce your child's exposure to animal allergens, the first two options below have been shown to be the most effective:

- Consider finding a new home for indoor cats, dogs, and pet rodents
- At a minimum, keep pets outside
- If neither of those are possible, the following may help reduce exposure:
    - Keep pets out of the child's bedroom
    - Encase mattresses and pillows
    - Remove carpets
    - Vacuum regularly using a cleaner with a HEPA filter or a double-layered microfilter bag (when the child is not around)
    - Use portable air cleaner with HEPA filter for child's bedroom
    - Keep pets off furniture and out of cars
    - Bathing cats and dogs has been shown to decrease these allergens, however, it must be done at least twice a week to be effective
- If rats or mice have been observed, use the least toxic extermination method, such as traps and baits
- Also use methods listed for cockroach control (See Cockroach Allergen and Asthma fact sheet below and on page 22 of the original guideline document)

Cockroach Allergen and Asthma

Additional History Questions to Supplement the History Form:

- Approximately how many cockroaches do you see in your home on a daily basis?
- Do you see evidence of cockroach droppings?
- How do you get rid of the cockroaches in your home?
- Does your child's school (or other places she/he spends time) have cockroaches?

Possible Interventions

Eradication can be very difficult, especially in apartment buildings, and it is often temporary. Roaches follow food and water sources in your house. In general, the least toxic methods of roach control should be employed first.

- Clean up all food items/crumbs/spills as soon as possible
- Store food and trash in closed containers
- Limit spread of food around house, especially bedrooms
- Fix water leaks under sinks
- Mop kitchen floor at least once a week
- Clean counter tops daily
- Take garbage out daily
- Check for and plug up crevices outside your house that cockroaches may enter
- Use the integrated pest management (IPM) approach for extermination — least toxic methods first
- Use boric acid powder under stoves and other appliances
- Use bait stations and gels. It is highly recommended to use a professional, licensed exterminator.

- If you choose to apply the pesticides yourself, read the product label and follow all directions carefully
- Avoid using liquid sprays inside the house, especially near places children crawl, play, or sleep
- Never attempt to use industrial strength pesticide sprays that require dilution

Mold/Mildew and Asthma

Additional History Questions to Supplement the History Form

- Do you see mold growth in any part of your home?
- How large an area is the mold growth? (i.e. greater than 3 ft. x 3 ft?)
- Does your child's school (or other places he/she spends time) have mold growth?
- Do you have problems with moisture or leaks in your home?
- Do you frequently have condensation on your windows?
- Have you tried using something to decrease the humidity in your home?

Possible Interventions

The emphasis should first be on controlling all sources of moisture in the house. Items that are too moldy to clean should be discarded. The size of the mold contamination in the house should determine how the mold gets cleaned up. Generally, an area of 3 feet x 3 feet or larger should be cleaned by a professional.

- Check faucets, pipes, and ductwork for leaks and repair as soon as possible
- Control indoor humidity
    - Use a dehumidifier or air conditioner (non-evaporative or water-filled type) to maintain indoor relative humidity below 50%
    - Clean the dehumidifier as instructed by the manufacturer
    - Do not use a humidifier
    - Vent bathrooms and clothes dryers to the outside
    - Install and use exhaust fans in the kitchen, baths and damp areas
    - Avoid carpet and wallpaper in rooms prone to dampness
    - For those who own a home with an evaporative cooler, control the humidity level with a dehumidifier
- When first turning on home or car air conditioners, have your child leave the room or drive with the windows open for several minutes to allow mold spores to disperse
- Remove decaying debris from the yard, roof, and gutters
- Your child should avoid raking leaves, mowing lawns, or working with peat, mulch, hay, or dead wood if he/she is allergic to mold spores
- If you choose to clean mold yourself, use chlorine solution diluted 1:10 with water but do not mix bleach with other cleaning solutions containing ammonia due to toxic fumes
- Quaternary ammonium compounds are effective fungicides when bleach cannot be used
- For extensive mold contamination, (greater than 9 square feet – 3 ft. x 3 ft.) professional removal is recommended.

Environmental Tobacco Smoke and Asthma

Additional History Questions to Supplement the History Form

- Who in the family smokes cigarettes?
- How many cigarettes per day?
- Does he/she (they) smoke in the house?
- Outside? Both inside and outside? In the car?
- Does anyone who spends time at your house smoke (friends, neighbors, relatives)?
- Have you established a smoking ban or no smoking policy in the household?
- Does anyone smoke in childcare settings where the child stays?
- Describe the circumstances when your child may be exposed to smoke?

Possible Interventions

- Keep your home and car smoke-free
- Seek support to quit smoking, consider aids such as nicotine gum, patch, and medication from your doctor to help you in quitting
- Choose smoke-free childcare and social settings
- Seek smoke-free environments in restaurants, theaters, and hotel rooms

- If you choose to smoke, do not smoke near your child

Air Pollution and Asthma

Additional History Questions to Supplement the History Form

Indoor Air Pollution Questions

- Do you live in a home that was built in the past 1 to 2 years?
- If you recently made changes to your house – installed new carpets, painted, or other changes – how long ago was that?
- Was there a change in your child's asthma symptoms after moving to a new house or having the work mentioned above done in your home?
- Do you ever notice a chemical smell in your home?
- If you have a wood burning fireplace or stove, how many times per month in the winter do you use it?
- Does anyone in your house use strong-smelling perfumes, scented candles, hairsprays, or other aerosol substances?

Outdoor Air Pollution Questions

- Do you live within 300 yards of a major roadway or highway? An area where trucks or other vehicles idle? A major industry with smokestacks?
- Is residential or agricultural burning a problem where you live?
- How do you hear about air quality alerts?

Possible Interventions

For indoor air pollution, the two best approaches to reducing indoor air pollution are source control and ventilation.

- Eliminate tobacco smoke
- Use good housekeeping practices to control particles
- Install an exhaust fan close to the source of contaminants, and vent it to the outside
- Properly ventilate the room where a fuel-burning appliance is being used
- Ensure that wood stove doors are tight-fitting
- Follow manufacturers' instructions when using an unvented kerosene or gas space heater
- Ensure that fireplaces are properly vented so smoke escapes through the chimney
- Never use a gas-cooking appliance as a heating source
- Open windows especially when indoor pollutant sources are in use (this option must be balanced against the concern of mold or other plant allergens and outdoor air pollution)
- Parents should change clothes prior to returning from work if they work around any strong smelling chemicals or paints or other toxic substances
- Avoid strong odors and minimize use of products and materials that emit irritants, such as smoke, strong perfumes, talcum powder, hair sprays, cleaning products, paint fumes, sawdust, chalk dust, air freshener sprays, and insect sprays

Outdoor air pollution, especially ozone and particulate matter can increase asthma symptoms.

- Monitor air quality index levels and reduce your child's outdoor activities when the Air Quality Index (AQI) is in the unhealthy range
- If your child's symptoms are worse or he/she requires more albuterol (rescue medicine) the day after AQI levels are in the unhealthy range, contact your health care provider
- Use HEPA filters in household vents
- Reduce use of candles, wood-burning stoves and fireplaces
- If particle pollution levels are high outdoors, do not vacuum the floor since this increases particle levels indoors
- Advise your child to stay away from the exhaust pipe of idling school buses and trucks
- Consider moving to a new location if this is possible

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Pediatric asthma

Guideline Category

Management

Clinical Specialty

Allergy and Immunology

Emergency Medicine

Family Practice

Internal Medicine

Nursing

Pediatrics

Pulmonary Medicine

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Physician Assistants

Physicians

Respiratory Care Practitioners

Social Workers

Guideline Objective(s)

To integrate environmental management of asthma into pediatric health care

To educate health care professionals on how to advise families about environmental interventions that can reduce or eliminate triggers for children who are already diagnosed with asthma

To guide primary care providers to consider environmental factors that may affect their patients' asthma. In some cases triggers may be more readily apparent than others

Target Population

Children 0 to 18 years of age already diagnosed with asthma

Interventions and Practices Considered

- Administration of environmental history
  - Environmental History Form for Pediatric Asthma Patient
- Allergy testing if indicated
- Referral to asthma specialist if indicated
- Counseling of patient and patient's family on controlling exposures that trigger child's asthma:
  - Dust mites
  - Animal allergens
  - Cockroach allergen
  - Mold/mildew
  - Tobacco smoke
  - Air pollution
- Follow-up visits

Major Outcomes Considered

- Asthma associated morbidity
- Reduction or elimination of triggers for children who are already diagnosed with asthma

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Description of Methods Used to Collect/Select the Evidence

2013 Reaffirmation

The National Environmental Education Foundation, Inc (NEEF) reviews literature from PubMed and the Cochrane Library on a regular basis (2009-2013).

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Rating Scheme for the Strength of the Evidence

Not applicable

Methods Used to Analyze the Evidence

Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Peer Review

Description of Method of Guideline Validation

This document was reviewed in draft form by individuals chosen for their unique perspectives and technical expertise. The purpose of this independent review was to elicit candid and critical comments that would assist in making this publication as sound and effective as possible.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Environmental management of pediatric asthma will reduce or eliminate triggers for children with asthma, reducing exacerbations and decreasing asthma related morbidity.

Potential Harms

Not stated

Qualifying Statements

Qualifying Statements

It is important to recognize that environmental management is only one component of a comprehensive asthma management plan. These guidelines are founded upon the National Asthma Education and Prevention Program's (NAEPP) "Guidelines for the Diagnosis and Management of Asthma" and it is recommended that they be used in conjunction with the clinical and pharmacological components of the NAEPP Guidelines. Additional guidance includes the use of pulmonary function testing and referral to an asthma specialist, either a pulmonologist or an allergist. No attempt is being made with these guidelines to supersede those of NAEPP, but rather to complement them. All children should have a written asthma care plan, and every child with mild persistent or more severe asthma should be treated with long-term control medication.

Environmental asthma triggers include indoor and outdoor allergens—such as dust mites, cockroaches, animal allergens, and pollens—and indoor and outdoor pollutants and irritants, including environmental tobacco smoke (or secondhand smoke), chemicals, combustion by-products, and ozone and particulate matter. Although viruses and upper respiratory infections can exacerbate an asthma attack, they are not considered environmental asthma triggers for purposes of these guidelines.

Implementation of the Guideline

Description of Implementation Strategy

Rather than compete with a crowded curriculum by adding separate course content, environmental management of asthma content can be integrated into existing pediatric instruction. This can be done by using environmental management of pediatric asthma to enhance existing case studies, or as exemplars. Additional opportunities for integration include the full range of continuing education programs, including Internet-based continuing education offerings, policy statements issued by national professional associations, and certification of training in environmental management of pediatric asthma.

For both medical and nursing education, a primary strategy for incorporating environmental management of pediatric asthma into existing curricula is to develop and support faculty champions/leaders who can take a leadership role in integrating children's environmental health into their institution in a sustainable fashion. These faculty members can lend expertise and support in their institutions and surrounding communities, teach courses, integrate competencies into curriculum, and serve as role models for how to integrate environmental health into health professional education. Residency Review Committees can require that such content be included in the residency curriculum. In addition, medical and nursing students can play a role in influencing curricula by educating fellow students through student organizations, such as the American Medical Student Association and National Student Nurse Association, and by encouraging school faculty and deans to introduce such content into the courses they offer.

Below are specific examples of points of insertion for environmental management of pediatric asthma content in medical and nursing curricula. It is recommended that such content be incorporated at all levels of the curricula.

For medical education, the competencies can be incorporated into various courses throughout the four years of medical school and in residency. In the 1st and 2nd year of medical school, competencies can be taught in physical diagnosis, introduction to clinical medicine, and introduction to patient assessment courses. In the 3rd year, this material can be reinforced during clinical rotations and be included in medical school clerkships in pediatrics and family medicine. In the 4th year, such content can be included in electives for evidence-based medicine, environmental health, preventive health, epidemiology, or similar subject curriculum; in rotations for emergency medicine, public sector medicine, primary care, and pediatric medicine; and in instruction in ethical and legal issues of medical practice. Education should continue throughout residency training so that when a physician sees a child with asthma, environmental exposures and potential interventions are always included in the asthma management plan.

For nursing education, environmental management of pediatric asthma content can be incorporated into various courses, electives, and units of instruction, depending on the curricula and course offerings of each school. For example, competencies in the knowledge, identification, and management of asthma triggers could be incorporated into patho-physiology, pediatric nursing, or community health nursing courses. Each of the competencies can be taught in classroom settings and reinforced in clinical rotations for various subjects, such as community health, public health, home health, maternal/child health, and primary care management. Competencies could also be incorporated into additional units of instruction on topics such as health promotion, health education/teaching; protection and prevention of illness and injury; leadership in nursing; and current trends and issues in nursing practice including school nursing. The communication skills and advocacy

competencies can be included in instruction on ethical, legal, and public policy issues and the patient advocacy role of the nurse. Additional points of insertion include environmental health nursing electives and fieldwork emphasizing environmental health.

There are numerous opportunities for incorporating environmental management of pediatric asthma content into pediatric health care practice. Practicing clinicians can introduce environmental management of pediatric asthma content into their daily practice by incorporating environmental history-taking and management of environmental triggers into the practices and protocols of the health settings where they deliver health care. Examples include adding environmental history-taking to electronic medical records, understanding the reimbursement available for teaching about environmental triggers and asthma management, or making referrals to asthma specialists or educators. Medical and nursing organizations and institutions can promote inclusion of environmental management of pediatric asthma in continuing education by offering continuing medical and nursing education sessions at conferences, grand rounds, and other educational functions, and by posting online modules on their websites.

In addition to medical and nursing curricula and clinical practice, it is recommended that environmental management of pediatric asthma content be integrated into the education and training of physician assistants, respiratory therapists, and licensed case/care management professionals.

Implementation Tools

Chart Documentation/Checklists/Forms

Foreign Language Translations

Patient Resources

Slide Presentation

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

National Environmental Education & Training Foundation (NEETF). Environmental management of pediatric asthma. Guidelines for health care providers. Washington (DC): National Environmental Education & Training Foundation (NEETF); 2005 Aug. 56 p. [112 references]

Adaptation

The Pesticides Initiative's National Pesticide Competency Guidelines for Medical & Nursing Education and the National Pesticide Practice Skills Guidelines for Medical & Nursing Practice served as models for the asthma guidelines.

Date Released

2005 Aug (reaffirmed 2013)

Guideline Developer(s)

National Environmental Education Foundation - Nonprofit Organization

Source(s) of Funding

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Guideline Committee

Pediatric Asthma Initiative Steering Committee

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Endorser(s)

Ambulatory Pediatric Association, American Association of Colleges of Nursing - Professional Association

Association of Faculties of Pediatric Nurse Practitioners - Professional Association

Guideline Status

This is the current release of the guideline.

The National Environmental Education Foundation, Inc. reaffirmed the currency of the guideline in 2013.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the National Environmental Education Foundation (NEEF) Web site . Also available in Spanish from the NEEF Web site .

Print copies: Available from The National Environmental Education Foundation, 4301 Connecticut Avenue NW, Suite 160, Washington, DC 20008.

Availability of Companion Documents

The following are available:

- Environmental management of pediatric asthma: guidelines for health care providers. An overview. Slide show. Washington (DC): National Environmental Education Foundation (NEEF). Electronic copies: Available from the National Environmental Education Foundation (NEEF) Web site .
- Environmental management of pediatric aasthma: guidelines for health care providers. A training slide show. Washington (DC): National Environmental Education Foundation (NEEF). Electronic copies: Available from the NEEF Web site .

The following are also available in the original guideline document :

- Set of competencies for the environmental management of asthma (Part 1)
- Environmental history form for pediatric asthma patient (Part 2). Also available in English and Spanish from the NEEF Web site
- Asthma home environment checklist (Appendix)

Patient Resources

Sample patient flyers and patient information sheets on environmental allergens are available in the original guideline document .

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This summary was completed by ECRI on February 14, 2007. The information was verified by the guideline developer on March 2, 2007. The

information was reaffirmed by the guideline developer in 2008 and updated by ECRI Institute on January 13, 2011. The currency of the guideline was reaffirmed by the developer in 2013 and this summary was updated by ECRI Institute on October 29, 2013.

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